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On the Compensation and Activity of Corporate Boards

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On the Compensation and Activity of Corporate Boards☆

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Highlights

- Examine the association between director compensation and director activity
- Firms use meeting fees and equity-based compensation as substitutes.
- Meetings fees are associated with more active boards and committees.
- Equity-based compensation increases monitoring activity but not advising activity.

- More active boards and committees are paid more.

Abstract

Within the nexus of contracts that makes up the firm, relatively little is known about the relationship between firms and their directors. Using a unique dataset comprising director compensation and activity, I find that firms use meeting fees and equity-based compensation as substitutes. In addition, paying directors for attending board/committee meetings is associated with more active boards and more active monitoring and advising committees. In contrast, a higher proportion of equity-based compensation is positively associated with monitoring activity but negatively associated with advising activity. Furthermore, more active boards and committees are paid more. Finally, I find that the variation in director compensation and activity generally reflects trade-offs between the costs and benefits of director effort, consistent with prior work.

Keywords

Corporate boards, Director compensation, Director activity, Contracting

1. Introduction

When focusing on the firm as a nexus of contracts, prior work has emphasized contracting with chief executive officers (CEOs). Far less is known about the contractual relationships between firms and their directors. Given that directors are responsible for safeguarding shareholders' interests, a firm's contracts with its board members also form a central component of the nexus of contracts that makes up the firm. Thus, understanding the firm's contractual relationship with its directors allows for a better understanding of the firm itself.

While a large empirical literature examines various board characteristics and the effectiveness of different corporate governance mechanisms, relatively few studies focus in-depth on board compensation and activity.[1] Moreover, prior work has typically looked at either director compensation or director activity, but not at both.[2] This is somewhat surprising because board compensation, board activity, and the link between the two are attracting increased attention from parties external to firms. For example, following MF Global Holdings' collapse in 2011, the board was criticized for being “less than responsive” because it met only seven times that year, compared with 11 and 22 times in the previous two years (Seol, 2012). Similarly, a *New York Times* article noted that in 2012 the Goldman Sachs' board met 12 times while directors were paid on average almost $480,000 (Craig, 2013).

A related issue is the use of meeting fees to compensate directors. The 2013 Director Compensation Survey by the National Association of Corporate Directors reports that director pay is on the increase, as is the use of equity compensation. And yet, 57% of small-cap firms and 28% of the largest 200 companies continue to pay meeting fees (Mullen, 2013). While such payments account for only a small proportion of director compensation, prior work suggests that meeting fees encourage director attendance (Adams and Ferreira, 2008). Thus, a relatively unexplored issue is the popularity of using meeting fees to compensate directors, and the extent to which meeting fees and other components of director compensation are associated with board activity, particularly monitoring and advising functions.[3]

In this paper, I focus jointly on director compensation and activity to provide insights into how firms contract with their external directors. In particular, I examine how different components of director compensation interact with each other, and how they are associated with different types of director

activity (monitoring and advising). Finally, consistent with prior work suggesting that specific contract features are determined by a firm's needs and circumstances, I provide further evidence as to how director compensation and activity vary as a function of firms' demands for director effort.[4]

I find that firms appear to use meeting fees as a substitute for other types of incentive-based compensation, and that different aspects of compensation (level, equity-based compensation, and meeting fees) have different effects on board monitoring and advising activities. Specifically, I find that paying directors for attending board/committee meetings is associated with more-active boards and committees, and that more-active boards and committees are paid more. In contrast, at the committee level, a higher proportion of equity-based compensation is positively associated with monitoring activity but negatively associated with advising activity.

Consistent with the findings of prior work (e.g., Adams, 2003, Linck et al., 2009, Linn and Park, 2005), I also find that the relationship between a firm and its board of directors generally reflects trade-offs between the costs and benefits of director effort. In particular, more complex firms and firms with greater information asymmetry pay their directors more. Further, firms with more growth opportunities pay their directors with a higher proportion of equity-based compensation.

With respect to activity, I find that more complex firms have more-active boards and committees. I also find an inverse U-shaped association between information asymmetry and both the proportion of equity-based compensation and activity, consistent with predictions by Kumar and Sivaramkrishman (2008). Overall, these results suggest that when firms benefit more from director effort, they pay directors more, use more incentive pay, and their directors are more active. These findings are consistent with those in Fedaseyeua et al. (2014) that director compensation is determined by their qualifications, experience, and effort. The results are robust to different specifications that attempt to address potential endogeneity concerns.

The rest of the paper is organized as follows. Section 2 provides a review of the literature. Section 3 develops my hypotheses, and the data are described in Section 4. Section 5 presents my findings from empirical tests, and Section 6 concludes.

2. Literature review

A corporate board is responsible for monitoring and advising management. Different firms have different demands for monitoring and advising, depending on the costs and benefits of such services (e.g., Adams, 2003, Demsetz and Lehn, 1985, Gillan et al., 2011). These costs and benefits are determined by firm characteristics, suggesting that there is an association between such characteristics and aspects of the contract between the firm and its board. More importantly, different aspects of that contract, including director compensation and director activity, should influence one another because they are determined by the overall demand for director effort. Yet, most prior work has focused on either director compensation or director activity (but not both) as a function of firm characteristics rather than on the link between them. In this section, I briefly review the literature on corporate boards that studies director compensation and activity.

2.1. Director compensation

Although a large body of literature examines CEO compensation, the focus on director compensation is more recent. From a theoretical perspective, Kumar and Sivaramkrishman (2008) show that the relation between a director's incentive pay and his or her monitoring effort is conditional on the information asymmetry between managers and outside investors. Information asymmetry between managers and shareholders increases the

demand for outside directors. With some cost, outside directors can learn what managers know, but outside directors cannot communicate that information directly to shareholders. Information asymmetry also increases the manager's bargaining power and the directors' dependence on the manager to acquire information.[5] At some level of information asymmetry, the director becomes too dependent on the manager, and there is no marginal benefit of outside director monitoring; thus, the demand for outside directors decreases. Consequently, the association between information asymmetry and the demand for director effort is concave.

Other work finds evidence of an association between firm characteristics and director compensation structures. For example, Yermack (2004) reports that director equity awards are positively associated with firms' investment opportunities and cash scarcity, but negatively associated with firms' tax-loss carry-forwards. Brick et al. (2006) find that total board compensation is positively associated with proxies for the need for monitoring and the difficulty of the directors' tasks. Furthermore, Linn and Park (2005) find that firms with more growth opportunities tend to have higher director compensation and use more incentive pay. Linck et al. (2009) also report that firm size is positively associated with total director pay and that research and development (R&D) expenditures are positively associated with the proportion of director pay in the form of stock options. Focusing on audit committees, Engel et al. (2010) show that audit committee compensation (total and cash retainer) is positively related to the firm's demand for monitoring (proxied by audit fees and the impact of Sarbanes–Oxley Act (SOX) regulations on the firm). In addition, Adams (2003) looks at compensation paid to directors who sit on different types of committees (monitoring, strategic, and stakeholder interests) and the meeting frequency of those committees. She documents that more diversified firms have a higher demand for director monitoring but the opposite holds for large firms and firms with more uncertainty. She also reports that growing firms devote more director effort to strategic issues, and that large, growing, and old firms have more director effort focused on the interests of the firms' other stakeholders. More recently, Fedaseyeua et al. (2014) report that directors who are board or committee chairs (which proxies for higher workload) or directors with better qualifications (such as directors with legal or consulting experience) are paid more.

2.2. Director activity

Director activity, or more generally effort, is inherently difficult to observe; thus, theory suggests that contracts should be based on observables presumed to be correlated with effort (e.g., Banker and Datar, 1989, Holmstrom, 1979). Menon and Williams (1994, p. 125) suggest that “there is some information conveyed by the frequency of meetings. … Several meetings would generally indicate a more serious effort to monitor management.” From this perspective, meeting frequency is arguably an observable proxy for board activity and board effort. For example, the E-Trade Financial Corp. board met 34 times in 2008 and 53 times in 2009, whereas in the other years between 2003 and 2011, the board met an average of 17 times. The firm's 2009 proxy statement explained that during 2008 and 2009, the firm had undergone “two major re-capitalizations.” While anecdotal, this suggests that when a firm needs more effort from its directors, the directors will meet more often. In other words, director meeting frequency is associated with director effort.

Other papers use meeting frequency as a proxy for director effort and find some evidence of an association between the number of meetings and firm characteristics. For instance, Vafeas (1999) finds that board meeting frequency is negatively associated with prior performance, consistent with the view that more effort is needed to turn firms with poor performance around, and further, that boards of poorly performing firms are under pressure to “be seen” as having done their jobs. Deli and Gillan (2000) document that large and highly levered firms have more independent and active audit committees, consistent with such firms having a higher demand for accounting certification to reduce contracting costs. In a more recent study, Brick

and Chidambaran (2010) examine the determinants of board *monitoring* activity and find that boards (and audit committees) meet more often when they have a need for information, for example, during a merger or acquisition or earnings restatement.

2.3. Director compensation and activity

Director compensation and activity are two central aspects of the contract between the firm and its board members; thus, I would expect them to be determined simultaneously and to likely influence each other. For example, using data from 1992 to 2001, Brick et al. (2006) find that the number of board meetings is positively associated with directors' cash and total compensation. Further, Adams and Ferreira (2008) find that paying meeting fees increases board meeting attendance, even though the dollar amount per meeting appears relatively small. Together these results provide some evidence of the association between director compensation and director activity (or effort).

3. Research questions

I examine the association between director compensation and director activity. Theory suggests that when perfect monitoring is difficult or infeasible, the principals (the shareholders) should provide incentives for the agents (in this case, the directors) to exert the desired level of effort. The rationale is that higher effort is associated with improved performance and better outcomes (Holmstrom, 1979). Paying directors with stock or stock options increases the sensitivity of director compensation to performance and allows them to share income that results from their effort. In addition, theory suggests that the firm's contract with its directors should be based on observables presumed to be correlated with their effort (e.g., Banker and Datar, 1989, Holmstrom, 1979). Meeting frequency and director attendance are arguably such observables. In this sense, paying directors for attending board or committee meetings can also be viewed as a form of incentive payment. In general, the more difficult it is for a firm to measure director effort and performance, or the more likely the directors will shirk, the larger the proportion of compensation the firm should pay as incentive compensation, and the more likely the firm is to use meeting fees as an incentive device. Therefore, I expect that firms paying more incentive-based compensation (either equity-based compensation or meeting fees) have more active boards, and that more active boards are compensated more. A potential mechanical association between board activity and board compensation is of concern if director compensation increases simply because firms pay meetings fees. That is, meeting fees increase both director activity and compensation. However, as I show later, because of the substitution of meeting fees for equity-based compensation, firms paying meeting fees appear to pay *lower* total director compensation, and increases in activity indeed increase director compensation.

Further, different firms will have different demands for monitoring and advising by their directors. The demand for monitoring and advising, in turn, affects the way that firms contract with their directors, including the use of different types of compensation (e.g. stock, stock options, and meeting fees). Thus, I provide further insights into board governance by determining whether different types of compensation are substitutes for, or complements to, each other and how they affect board activity.

As suggested by prior work (e.g., Demsetz and Lehn, 1985, Gillan et al., 2011), a firm's demand for director effort is determined by firm characteristics that influence the costs and benefits of director effort. Thus, in studying the association between director compensation and activity, I control for such firm characteristics. This approach is generally consistent with the contracting literature (e.g., Milgrom and Roberts, 1992) and empirical evidence (e.g., Adams, 2003, Linck et al., 2008, Linck et al., 2009, Linn and Park, 2005, Smith and Watts, 1992, Yermack, 2004). Based on this prior work, I

categorize firm characteristics that capture aspects of the firm's contracting environment into four groups: complexity, growth opportunities, potential agency costs, and information asymmetry.

More complex firms, such as firms with disparate business segments and geographically dispersed operations, should benefit more from board effort (e.g., Adams, 2003, Boone et al., 2007, Coles et al., 2008, Fama and Jensen, 1983, Lehn et al., 2009, Linck et al., 2008). The increased demand for board effort might be due to greater potential agency problems associated with larger firms or more diversified operations, which in turn require more effort to monitor managers' performance. Further, firms expanding into new product lines or new geographical regions might need added input from board members with specific knowledge about the area of expansion. In addition, Smith and Watts (1992) argue that future growth opportunities are relatively more difficult to manage than assets in place; thus, the marginal benefit of director effort is higher at firms with more growth opportunities. The same argument applies for agency costs.[6] All else equal, firms with higher (potential) agency costs will benefit more from director effort, especially monitoring effort (Jensen and Meckling, 1976). More importantly, while the costs of director monitoring (effort) increase with complexity and growth options, Fama and Jensen (1983) argue that the benefits of monitoring should outweigh the costs. That is, the demand for director effort increases with firm complexity, growth opportunities, and agency costs until the net benefit is zero. With regard to information asymmetry, following Kumar and Sivaramkrishman's (2008) predictions, I expect that the association between information asymmetry and the demand for director effort is concave.

4. Data

4.1. Data and variable definitions

I identify firms in the S&P 1500 as of June 1 of each year from 2006 to 2009. This results in a base sample of approximately 1800 unique firms. For each firm, I collect three main groups of variables: director compensation, board activity, and firm characteristics.

4.1.1. Director compensation variables

Details on director compensation are collected from Execucomp. Data on meeting fees (including whether firms pay meeting fees and the amount paid per meeting) are not available from Execucomp and are collected from Morningstar. Morningstar does not report the aggregate dollar amount of meeting fees. Thus, I estimate the aggregate meeting fees as the sum of board and committee meeting fees, which I calculate as fees per board or committee meeting multiplied by the number of meetings held in the fiscal year multiplied by the total number of outside directors on the board or committees. Of note, actual director attendance is not available; thus, the estimated total meeting fees represent the maximum possible total meeting fees, assuming that all directors attend all board meetings and all committee members attend all committee meetings.

My emphasis is on three measures of director compensation: (1) *Aggregate Outside Director Compensation*, the aggregate compensation paid to all outside directors each year; (2) *% Equity-based Compensation*, calculated as the aggregate value of stock and stock options divided by the total compensation paid to all outside directors; and (3) *Meeting Fees*, an indicator variable that equals 1 if the firm pays board or committee meeting fees, and zero otherwise.[7] Note that I focus primarily on aggregate board-level compensation rather than director-level compensation because the firm demands effort from the board as a whole. However, in robustness tests, I use director-level compensation and the results hold. In addition, I focus on whether firms pay meeting fees (rather than on how much they pay per meeting) for several reasons. First, almost 70% of the firms in the sample pay meeting fees; however, there is little variation in meeting fees across firms — most firms pay between $500 and $3000 per meeting. Second, although

aggregate meeting fees account for a relatively small proportion of director total compensation, Adams and Ferreira (2008) show that directors at firms that pay meeting fees have fewer attendance problems than directors at other firms, suggesting that directors respond to these fees. Thus, it appears that paying or not paying meeting fees, rather than the magnitude of the payment itself, is what separates firms in the sample.

4.1.2. Activity variables

I use the number of board meetings as a proxy for board activity. However, I also use the aggregate number of board and committee meetings because boards often delegate tasks to committees. Board and committee meeting frequency are obtained from The Corporate Library (TCL), supplemented with hand collection from proxy statements where necessary.[8]

Further, following prior literature (Adams, 2003, Adams and Ferreira, 2009, Hayes et al., 2004), I classify board committees into three categories based on their main functions. *Monitoring Committees* comprises committees whose main function is to monitor management, such as Audit, Compensation, Nominating, and Governance committees. *Advising Committees* includes committees whose main function is to provide advice to managers on key issues, such as Finance, Investment, and Strategy committees. Finally, *Other Committees* contains committees whose function does not fit cleanly into the main monitoring/advising classifications, such as Health, Environment, Safety, and Public Policy committees (see Appendix A for a complete list of committees in each category). I aggregate the meetings of all committees within each category to proxy for the activity of that category. Specific measures of board/committee activity that I examine include *Board Meetings*, *Board and Committee Meetings*, *Monitoring Committee Meetings*, *Advising Committee Meetings*, and *Other Committee Meetings*.[9]

4.1.3. Firm characteristics and other variables

I use several firm characteristics from the literature to proxy for the firm's contracting environment. These measures are collected or constructed using data from the Center for Research in Security Prices (CRSP) and Compustat. In particular, *Firm Size* and *Segments* proxy for a firm's complexity (e.g., Linck et al., 2008). *Market-to-Book* and *Investments* capture a firm's growth opportunities (where *Investments* is measured by the sum of *R&D Expenditures*, the absolute value of *Capital Expenditures*, and the absolute value of *Acquisition Expenditures*, scaled by total assets). Note that I use the absolute value of capital expenditures and acquisition expenditures because I am interested in the magnitude of activity as opposed to whether it is an acquisition or a disposal of assets. *Stock Return Volatility*, which is calculated as the standard deviation of the firm's previous 12-month stock returns, is a proxy for information asymmetry (e.g., Linck et al., 2008). A firm's potential agency costs are captured by *Free Cash Flow*, calculated following Titman et al. (2004).

I also control for other firm characteristics (*Leverage* and *Stock Return*), CEO power (*Entrenchment Index*, *Duality*, and *CEO Ownership*), board characteristics (*Board Size*, *Board Independence*, and *Total Director Ownership*), and external governance (*Institutional Investors* and *Herfindahl–Hirschman Index*), all of which could affect the contracts between a firm and its board of directors. The final sample has 1384 unique firms, 16,749 firm-year committees, and 4354 firm-year observations with complete data (see Appendix B for more details on the sample selection process and Appendix C for detailed definitions and a description of the construction of all variables).

4.2. Sample description

Descriptive statistics are presented in Table 1A. Panels A and B report the summary statistics for director compensation and activity, respectively, and Panel C presents the summary statistics for firm characteristics and other variables.

Table 1A. Summary statistics.

This table presents the descriptive statistics for firms in the S&P 1500 from 2006 to 2009. The variables are defined in Appendix C.

Variable	**N**	**Mean**	**Median**	**Std Dev**
Panel A. Director compensation				
Total Board Compensation ($000)	4354	1436.61	1196.85	1163.40
Cash	4354	543.52	469.25	340.38
Stock	4354	501.27	305.15	598.67
Stock Options	4354	275.88	23.39	531.14
Pension	4354	10.730	0.00	64.34
Non-equity Incentive	4354	11.50	0.00	395.44
Other	4354	94.16	0.00	435.60
Director Total Compensation ($000)	4354	165.84	145.94	118.48
Meeting Fees (0/1)	4354	0.67	1.00	0.47
% Cash Compensation	4354	0.45	0.44	0.21
% Equity-based Compensation	4354	0.50	0.51	0.22
% Stock Compensation	4354	0.31	0.33	0.24
% Option Compensation	4354	0.19	0.03	0.25
Estimated Maximum % Meeting Fees	4354	0.13	0.10	0.15
Panel B. Board and committee activity				
Number of Committees	4354	3.85	4.00	0.99
Only Top 3 Committees (0/1)	4354	0.44	0.00	0.50
Board Meetings	4354	8.35	7.00	4.05
Monitoring Committee Meetings	4354	18.30	18.00	6.60
Advising Committee Meetings	4354	2.68	0.00	4.72
Other Committee Meetings	4354	0.82	0.00	2.12
Board and Committee Meetings	4354	29.35	28.00	11.01
Panel C. Firm/board/CEO characteristics				
Market Capitalization ($B)	4354	8.53	1.83	26.51
Segments	4354	5.39	5.00	3.46
Market-to-Book	4354	0.75	0.70	0.73
Investments	4354	0.10	0.08	0.10
Stock Return Volatility	4354	0.12	0.10	0.08
Free Cash Flow	4354	0.69	1.00	0.46
Leverage	4354	0.20	0.18	0.16

Stock Return	4354	0.15	− 0.01	7.67
Board Size	4354	9.47	9.00	2.38
Board Independence	4354	0.76	0.78	0.12
Total Director Ownership	4354	5.54	1.89	15.52
CEO Tenure	4354	7.09	5.00	6.91
CEO Ownership (%)	4354	0.02	0.00	0.06
Duality	4354	0.55	1.00	0.50
Entrenchment Index	4354	0.09	0.00	0.29
Institutional Investors	4354	276.99	198.00	237.95
HHI	4354	249.15	204.44	248.96

Panel A shows that the average firm in the sample pays a total of $1.4 million per year to its outside directors (median $1.2 million), or approximately $166,000 per outside director (median $146,000).[10, 11] General Electric Company's board is among the most highly paid, with $4–6 million in total compensation per year (about $360,000 per outside director). Among the lowest-paid boards is that of Heartland Express Inc., which was paid less than $50,000 per year (approximately $11,000 per outside director) during the 2006–2009 period. Director payments can take the form of cash, stock and stock options, pensions, non-equity incentives, and "other." The most common form of payment is cash (used by 99.3% of the firms), followed by stock and stock options (used by 83.4% and 63.1% of the sample firms, respectively) (not tabled).[12] In terms of the dollar amount, cash is also the single largest form of payment, averaging approximately 45% of total board compensation. Of the remainder, 31% is in the form of stock, 19% is in the form of stock options, while the remaining 5% includes pension, non-equity incentives, and other miscellaneous payments. Of the sample firms, 67% pay meeting fees, and I estimate that meeting fees account for 10–13% of total board compensation (assuming that directors attend all board meetings and all committee members attend all committee meetings).

As shown in Panel B, the average firm has between three and four committees. In addition, more than 44% of the sample (56% of the unique firms) have only audit, compensation, and nominating/governance committees. On average, boards hold 8.35 meetings a year (with a standard deviation of four meetings). The most active board is that of E-Trade Financial Corporation (53 meetings in 2009 during its "major re-capitalization"), while the least active board is that of Supertex, Inc., which held only two meetings in 2008. On average, monitoring committees meet 18.30 times a year, whereas advising and other committees meet approximately three times and once per year, respectively. Conditional on being non-zero, advising committee meetings average 6.3 times per year (median five times), while the average other committee meets 4.5 times per year (median four times). In comparison, Adams (2003) reports an average of 3.3 committees among Fortune 500 firms in 1998. In addition, Adams and Ferreira (2008) report an average of 7.24 board meetings (minimum of one and maximum of 36) for S&P 1500 firms during 1996–2003, and Brick and Chidambaran (2010) report 7.26 board meetings on average (minimum of one and maximum of 49) during the 1999–2003 time period.

The most active monitoring, advising, and other committees were those at Novatel Wireless, Inc. (77 meetings in 2008), Bank of the Ozarks (59 meetings in 2008), and Broadcom Corp. (27 meetings in 2008), respectively.[13] Novatel Wireless, Inc. and Bank of the Ozarks pay meeting fees, but Broadcom Corp. does not. However, Broadcom Corp. paid more to its directors, both in aggregate and at the director-level, than Novatel Wireless, Inc. or Bank of the

Ozarks.[14] Overall, there is evidence that boards delegate tasks to committees, and that at the committee level, monitoring appears to be the most important function of the board — the number of monitoring committee meetings is twice the combined number of board, advising committee, and other committee meetings.

Finally, Panel C shows that the average firm has a market value of approximately $8.5 billion, operates in 5.39 different business and geographic segments, and has a *Market-to-Book* ratio of 0.75 and *Investments* of 10%. Average *Stock Return Volatility* is 12%, while average *Free Cash Flow* is 0.7%. In addition, the average board has 9.47 members, of whom 76% are independent directors (based on TCL classifications) and owns a total of 5.54% of the firm. The average CEO has been with the firm for seven years (median five years), owns on average 2% of the firm, and is board chair 55% of the time. The *Entrenchment Index* which is the combination of the CEO's tenure of at least ten years and negative stock returns in the prior year (Salas, 2010), averages 0.09. Given that 1 is entrenched and 0 is not, this suggests low average entrenchment. Finally, the sample firms have an average of 277 institutional investors (median 198) and an average *Herfindahl–Hirschman Index* (*HHI*) of institutional ownership of approximately 250 (median 204) — a higher *HHI* indicates greater ownership concentration.

Table 1B, Table 1C report the summary statistics for firms broken down into Large-Cap, Mid-Cap, and Small-Cap groups and across industry classifications based on two-digit Standard Industrial Classification (SIC) codes, respectively. Table 1B indicates that large firms pay directors more and rely more on equity-based compensation, while smaller firms are more likely to pay meeting fees. In addition, large firms have more board and committee meetings. Across industries, except for the "Non-Classifiable Establishments" category, which includes only two firms, Mining firms pay their directors the most and have relatively active boards and committees. In comparison, Agriculture, Forestry and Fishing firms pay their directors the least and, in general, rely less on incentive-based compensation and have less active boards and committees (Table 1C).

Table 1B. Summary statistics by S&P classifications.
This table presents the descriptive statistics for Large Cap, Mid-Cap, and Small-Cap firms from 2006 to 2009. The variables are defined in Appendix C.

Variable	**Large-Cap (N = 1428)**			**Mid-Cap (N = 1180)**			**Small-Cap (N = 1734)**		
	Mean	**Median**	**Std Dev**	**Mean**	**Median**	**Std Dev**	**Mean**	**Median**	**Std Dev**
Panel A. Director compensation									
Total Board Compensation ($000)	2159.61	1914.22	1408.23	1350.05	1227.43	775.17	903.22	768.09	797.21
Director Total Compensation ($000)	215.44	190.87	132.94	166.55	144.17	100.34	124.78	107.04	100.60
% Cash Compensation	0.41	0.42	0.18	0.44	0.43	0.21	0.48	0.46	0.21
% Equity-based Compensation	0.54	0.54	0.19	0.50	0.52	0.23	0.47	0.49	0.22
Meeting fees (0/1)	0.58	1.00	0.49	0.72	1.00	0.45	0.70	1.00	0.46
Panel B. Board and committee activity									
Board Meetings	8.75	8.00	4.01	8.13	7.00	3.95	8.14	7.00	4.09
Monitoring Committee Meetings	20.08	19.00	6.19	18.04	17.00	6.53	16.96	16.00	6.51
Advising Committee Meetings	3.91	2.00	4.97	2.38	0.00	4.27	1.90	0.00	4.63
Other Committee Meetings	1.35	0.00	2.58	0.68	0.00	1.93	0.46	0.00	1.66

Board and Committee Meetings	32.95	31.00	10.86	28.42	27.00	10.61	26.95	25.00	10.46

Table 1C. Summary statistics by industry.
This table presents the descriptive statistics for firms from 2006 to 2009 across industry classifications based on two-digit SIC codes. The variables are defined in Appendix C.

Industry	**Industry 1**	**Industry 2**	**Industry 3**	**Industry 4**	**Industry 5**	**Industry 6**	**Industry 7**	**Industry 8**	**Industry 9**	**Industry 10**
N	**1877**	**642**	**576**	**468**	**386**	**179**	**132**	**71**	**14**	**9**
Panel A. Director compensation										
Total Board Compensation ($000)	1452.26	1282.55	1440.70	1519.73	1313.41	1847.95	1415.81	1458.34	966.98	3334.85
Director Total Compensation ($000)	169.84	169.11	138.47	155.92	155.72	239.03	169.28	185.79	132.63	250.03
% Cash Compensation	0.44	0.42	0.51	0.49	0.43	0.38	0.46	0.40	0.40	0.39
% Equity-based Compensation	0.51	0.55	0.41	0.45	0.53	0.56	0.50	0.54	0.47	0.53
Meeting Fees (0/1)	0.65	0.65	0.72	0.74	0.65	0.72	0.68	0.56	0.46	0.00
Panel B. Board and committee activity										
Board Meetings	7.99	8.53	9.71	8.40	7.46	9.07	7.90	8.06	5.92	11.38
Monitoring Committee Meetings	18.20	18.18	19.40	17.65	18.76	16.66	18.02	18.71	13.38	23.00
Advising Committee Meetings	2.19	1.65	5.57	3.90	1.93	1.24	2.93	1.54	3.23	0.00
Other Committee Meetings	0.81	0.63	0.94	1.33	0.30	1.13	0.46	0.54	1.15	2.88

Board and Committee Meetings	28.31	28.28	34.45	30.37	28.02	27.82	28.97	28.69	22.15	37.25
Industry 1	Manufacturing						Industry 6		Mining	
Industry 2	Services						Industry 7		Wholesale trade	
Industry 3	Finance, insurance and real estate						Industry 8		Construction	
Industry 4	Transportation, communications, electric, gas & san						Industry 9		Agriculture, forestry and fishing	
Industry 5	Retail trade						Industry 10		Non-classifiable establishments	

5. Empirical analyses

In this section, I present the results from the multivariate tests. In each table, Model 1 incorporates key aspects of the contracting environment and Model 2 controls for variables shown in the previous literature to affect director compensation and activity (including CEO, board, and institutional ownership along with other firm characteristics). To control for reverse causality, all the explanatory variables are lagged one year (e.g., Jiraporn et al., 2009). I also include industry and year fixed effects in all specifications, with industry identified using two-digit SIC codes. To facilitate the economic interpretation and to compare the effects, for each model specification (whether OLS, Probit, or Tobit) I report marginal effects for a one-standard-deviation increase from the mean for the continuous variables and for a move from zero to one for the indicator variables. The results are robust across these different specifications; therefore, I focus the discussion on the findings from Model 2.

5.1. Director compensation and activity

I focus on several dimensions of director compensation: (i) total compensation (both aggregate-level and director-level), (ii) the proportion of equity-based compensation, and (iii) the likelihood that a firm pays meeting fees. In terms of director activity, I examine overall board activity as a proxy for director effort. At the committee level, I focus on the key functions, including monitoring and advising. I examine the link between different components of director compensation and different types of director activity.

Because compensation and activity are both determined by firm characteristics, examining the effect of compensation on activity, or vice versa, raises endogeneity concerns; in this case, these concerns come primarily from a potential simultaneity bias that occurs when compensation and activity are jointly determined in equilibrium. Thus, it can be argued either that compensation causes activity, or that activity causes compensation. To address this issue, I use 2SLS models. Further, to address a potential selection bias, I use two-stage treatment effect models. All explanatory variables are lagged one period. Finally, I include industry and year fixed effects in all analyses to address the endogeneity concerns arising from omitted variables bias.

5.1.1. The effect of compensation on activity

In this section, I first examine the effect of paying meeting fees on board and committee activity. Of concern is that firms paying meeting fees might be systematically different from those that do not. To address this concern, I use two-stage treatment effect models. In the first stage, I estimate probit regressions modeling the likelihood of paying meeting fees. I use an indicator variable that captures whether the median firm in the two-digit SIC industry paid meeting fees in the previous year as an instrumental variable.[15] The rationale is that if the median firm in an industry pays for meetings, then paying meeting fees is likely a common practice in that industry, which in turn, should affect a particular firm's decision to pay meeting fees. However, whether or not the median firm pays for meetings should not directly affect that firm's director activity. The predicted likelihood of paying meeting fees from the first-stage regression is included in the second-stage regression, together with other variables, as before. The results from the second-stage regression are reported in Table 2. Panel A presents the results for board activity (measured by *Board and Committee Meetings*), while Panels B and C report the results for monitoring committee activity (using *Monitoring Committee Meetings*) and advising committee activity (using *Advising Committee Meetings*), respectively.

Table 2. Meeting fees and activity.

This table reports the results from the second stage of treatment effect models and OLS regression models with marginal effects for a one-standard-deviation increase from the mean for the continuous variables and for a move from zero to one for indicator variables. The dependent variables are the natural logarithm of *Board and Committee Meetings* (Panel A), *Monitoring Committee Meetings* (Panel B), and *Advising Committee Meetings* (Panel C). The instrumental variable is the lagged industry median of whether or not a firm pays meeting fees. The variables are defined as follows: *Board and Committee Meetings* is the aggregate number of board and committee meetings; *Monitoring Committee Meetings* is the number of monitoring committee meetings where monitoring committees are those whose main function is to monitor management; *Advising Committee Meetings* is the number of advising committee meetings where advising committees are those whose main function is to provide advisory service to management; *Meeting Fees* is an indicator variable that equals 1 if the firm pays fees per board or committee meeting, and zero otherwise; *Firm Size* is the natural logarithm of the firm's market capitalization, *Segments* is the sum of business and geographic segments; *Market-to-Book* is the natural logarithm of the firm's market-to-book value of equity; *Investments* is the sum of R&D expenditures, the absolute value of capital expenditures, and the absolute value of mergers and acquisitions expenditures, scaled by total assets; *Stock Return Volatility* is the standard deviation of the firm's one-year monthly stock return; *Free Cash Flow* is an indicator variable that takes the value of 1 if the firm's free cash flow scaled by total assets is greater than 5% and zero otherwise; *Entrenchment Index* is an indicator variable that takes the value of 1 if the current CEO has at least 10 years of tenure and the firm has negative stock returns, and zero otherwise; *Duality* is an indicator variable that takes the value of 1 if the current CEO is also the chairman of the board and zero otherwise; *CEO Ownership* is an indicator variable that takes the value of 1 if the percentage of equity owned by the current CEO is greater than 5% and zero otherwise; *Leverage* is calculated as long-term debt divided by the sum of long-term debt and the market value of equity; *Stock Return* is the cumulative one-year monthly stock return; *Board Size* is the total number of directors on the board; *Board Independence* is the proportion of independent directors on the board; *Total Director Ownership* is the percentage of equity owned by outside directors; *Institutional Investors* is the total number of institutional investors; and *HHI* is the sum squared percentage ownership of the top five institutional investors. All variables are measured at the end of the fiscal year, except for *Stock Return Volatility* and *Stock Return*, which are measured as of June of the current fiscal year. See Appendix C for more details. Standard deviations are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Variable	Panel A. Board activity		Panel B. Monitoring activity		Panel C. Advising activity	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Meeting Fees	0.4180***	0.3575***	0.3522***	0.3159***	1.1821***	1.1882***
	[0.0266]	[0.0299]	[0.0390]	[0.0427]	[0.0957]	[0.0918]
Firm Size	0.1529***	0.0900***	0.1317***	0.1084***	0.2551***	0.2518***
	[0.0045]	[0.0086]	[0.0048]	[0.0089]	[0.0167]	[0.0346]
Ln(Number of Segments)	0.0192***	0.0095*	0.0248***	0.0143**	0.006	0.0131
	[0.0096]	[0.0091]	[0.0098]	[0.0094]	[0.0355]	[0.0352]
Investments	0.0083	0.0116**	0.0074	0.0075	− 0.0514**	− 0.0203
	[0.0607]	[0.0581]	[0.0618]	[0.0603]	[0.2540]	[0.2562]
Market-to-Book	− 0.0469***	− 0.0367***	− 0.0350***	− 0.0292***	− 0.0666***	− 0.0535**
	[0.0092]	[0.0089]	[0.0094]	[0.0093]	[0.0356]	[0.0357]
Stock Return Volatility	0.0812***	0.0720***	0.0874***	0.0841***	0.1262**	0.1269**
	[0.1542]	[0.1512]	[0.1600]	[0.1594]	[0.5959]	[0.5968]
Stock Return Volatility Squared	− 0.0210*	− 0.0205*	− 0.0342***	− 0.0339***	− 0.0929*	− 0.0718
	[0.2313]	[0.2369]	[0.2366]	[0.2469]	[1.0241]	[1.0131]
Free Cash Flow	− 0.1203***	− 0.1054***	− 0.0525***	− 0.0506***	− 0.1635***	− 0.0001
	[0.0134]	[0.0183]	[0.0137]	[0.0189]	[0.0499]	[0.0727]
Entrenchment Index		− 0.0879***		− 0.1078***		− 0.0209
		[0.0201]		[0.0209]		[0.0710]
Duality		− 0.0611**		− 0.0403		0.1124
		[0.0306]		[0.0318]		[0.1239]
CEO Ownership		− 0.0404		− 0.0398		0.7975***
		[0.0379]		[0.0393]		[0.1952]
Free Cash Flow × Entrenchment Index		0.0660*		0.015		− 0.071
		[0.0394]		[0.0409]		[0.1684]
Free Cash Flow × Duality		− 0.0066		0.0119		− 0.1349
		[0.0239]		[0.0248]		[0.0895]
Free Cash Flow × CEO Ownership		− 0.0311		− 0.0475		− 0.7155***
		[0.0438]		[0.0454]		[0.2265]
Leverage		0.0022		− 0.0107*		− 0.0466*
		[0.0344]		[0.0358]		[0.1485]
Stock Returns		− 0.0014		0.0006		− 0.1785
		[0.0008]		[0.0008]		[0.0537]
Board Size		0.0340***		0.0115		0.1356***

		[0.0029]		[0.0030]		[0.0110]
Board Independence		0.0603***		0.0599***		0.1160***
		[0.0465]		[0.0482]		[0.1997]
Total Director Ownership		− 0.0097*		− 0.0175***		0.0617**
		[0.0004]		[0.0004]		[0.0018]
Institutional Investors		0.0383***		0.013		− 0.0335
		[0.0000]		[0.0001]		[0.0002]
HHI		0.0146***		0.0203***		0.0176
		[0.0000]		[0.0000]		[0.0001]
Year fixed effects	4354	4354	4354	4354	1845	1845
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	Yes	Yes	Yes	Yes	Yes	Yes
LR test of independent equations	< .0001	< .0001	< .0001	< .0001	< .0001	< .0001

As shown in Table 2, likelihood ratio tests reject the null hypothesis that the first stage selection model and the second stage regression model are independent, suggesting that applying the treatment effect models in these cases is appropriate. Consistent with my expectation, the coefficients on *Meeting Fees* are positive and significant in all specifications, suggesting that firms paying meeting fees have more board and committee meetings than other firms. Specifically, firms that pay meeting fees have an additional 10 aggregate board and committee meetings (or 36%), 6 more monitoring committee meetings (or 32%), and 3 more advising committee meetings (or 119%), respectively. These findings are consistent with expectations that boards and committees of firms that pay meeting fees are more active.

With respect to firm characteristics that determine the costs and benefits of director effort, the results in Table 2 also suggest that boards at more complex firms (as measured by *Firm Size* or *Segments*) meet more often. In terms of economic significance, whereas boards and committees at firms with low complexity (measured as those in the 25th percentile based on size and the number of segments) meet 25.1 times, boards at more complex firms (in the 75th percentile based on size and the number of segments) meet 29.5 times, or 17.3% more (Panel A, Model 2). Similarly, monitoring committees at less complex firms meet 15.4 times, whereas monitoring committees at more complex firms meet 18.6 times, or 20.6% more (Panel B, Model 2). Further, advising committees at more complex firms meet 5 times, compared with 3.8 times for less complex firms, a 30.5% difference (Panel C, Model 2). These results are consistent with the hypothesis that more complex firms have a higher demand for board effort, both in terms of monitoring and advising, and as a result, boards and committees meet more often. Of note, while the differences are statistically significant, large in percentage terms, and generally consistent with my expectations, it is perhaps surprising that the absolute differential in meeting activity is relatively small across such levels of disparity in firm characteristics.[16] This also suggests that there might be limits to the benefits of more frequent board meetings irrespective of firm complexity.

Consistent with Kumar and Sivaramkrishman's (2008) prediction of a concave association between information asymmetry and the demand for board effort, the coefficient of *Stock Return Volatility* is positive and significant, whereas the coefficient of (*Stock Return Volatility*)^2 is negative and significant

in all specifications (except Model 2, Panel C). In Model 2, Panel A, counter to expectations, the coefficient on the proxy for potential agency costs, *Free Cash Flow*, is negative and significant in all specifications. However, I observe a positive coefficient on the interaction term *Free Cash Flow* $*$ *Entrenchment Index*, suggesting that for entrenched CEOs at firms with free cash flows (where agency problems are likely higher), director monitoring increases to offset CEO power. As a result, boards are more active. However, the coefficient on the interaction term is not significant in either Panel B or C, so the evidence here is mixed. Further, I find no evidence that growth opportunities are associated with increased committee activity, especially advising committee meetings (my prior is that firms with more growth opportunities would benefit more from director advising effort). Indeed, the coefficient on *Market-to-Book* is negative and significant in almost all specifications. This result is consistent with Deli and Gillan's (2000) finding of a negative association between market-to-book and the independence and activity of audit committees, but it is inconsistent with Brick and Chidambaran (2010) report of a positive association between Tobin's Q and the number of board meetings. The signs of the coefficients for other control variables are largely consistent with expectations.

As a robustness test, I break down the sample firms into Large-Cap, Mid-Cap, and Small-Cap groups and re-estimate the effect of paying meeting fees on director activity for each group. The results (not tabled) are qualitatively similar, although there are too few observations to estimate the model for advising activity for the Mid-Cap and Small-Cap groups. As a further robustness check, I estimate the effect of paying meeting fees on director activity using OLS specifications that include the indicator variable *Change in Paying Meeting Fees* together with other variables used in earlier specifications. *Change in Paying Meeting Fees* takes a value of 1, 0, or − 1, which corresponds to firms that (1) start paying meeting fees, (2) do not change their meeting fee policy, or (3) stop paying meeting fees. The results (not tabled) indicate that while the coefficients for other variables are consistent with earlier findings, there is no significant association between *Change in Paying Meeting Fees* and director activity. Note that firms tend not to change their meeting fee policy very often. In this sample, only 265 out of 1384 firms switched their policy during the 2006–2009 period (49 firms started paying meeting fees, 174 firms stopped paying meeting fees, and 42 firms switched back and forth). Thus, out of 4354 firm-year observations, only 314 observations have a non-zero *Change in Paying Meeting Fees*. The insignificant association between *Change in Paying Meeting Fees* and director activity could be the result of a low powered test.

Next, I estimate the effect of paying equity-based compensation on director activity. I use 2SLS with the two-digit SIC industry median proportion of equity-based compensation as an instrumental variable. Again, the rationale is that the proportion of equity-based compensation used by the median firm in an industry represents the standard practice in that industry, which in turn, should affect an individual firm's choice of how much equity-based compensation to pay its directors. However, the proportion of equity-based compensation by the median firm should not directly affect that firm's director activity. The results are reported in Table 3. Note Wu–Hausman tests (not tabled) fail to reject the hypothesis that *% Equity-based Compensation* is exogenous, suggesting that OLS models are more efficient for examining the effect of *% Equity-based Compensation* on board activity (as measured by *Board and Committee Meetings*). Therefore, in Panel A I report the results from OLS regressions of *% Equity-based Compensation* on board activity. Note that because of the requirement of equity-based compensation data available in the prior year for the first stage regression, the number of observations drops to 3276 in Panels A and B and 1404 in Panel C.

Table 3. Equity-based compensation and activity.

This table reports the results from the OLS regression models (Panel A) and the second stage of 2SLS regression models (Panels B and C) with marginal effects for a one-standard-deviation increase from the mean for the continuous variables and for a move from zero to one for indicator variables. The dependent variables are the natural logarithm of the *Board and Committee Meetings* (Panel A), *Monitoring Committee Meetings* (Panel B), and *Advising Committee Meetings* (Panel C). The instrumental variable is the lagged industry median of the proportion of equity-based compensation. The variables are defined as follows: *Board and Committee Meetings* is the aggregate number of board and committee meetings, *Monitoring Committee Meetings* is the number of monitoring committee meetings where monitoring committees are those whose main function is to monitor management, *Advising Committee Meetings* is the number of advising committee meetings where advising committees are those whose main function is to provide advisory service to management, *% Equity-based Compensation* is the proportion of total compensation paid in the form of stock or stock options for the whole board, *Firm Size* is the natural logarithm of the firm's market capitalization, *Segments* is the sum of business and geographic segments, *Market-to-Book* is the natural logarithm of the firm's market-to-book value of equity, *Investments* is the sum of R&D expenditures, the absolute value of capital expenditures, and the absolute value of mergers and acquisitions expenditures, scaled by total assets, *Stock Return Volatility* is the standard deviation of the firm's one-year monthly stock return, *Free Cash Flow* is an indicator variable that takes a value of 1 if the firm's free cash flow scaled by total assets is greater than 5% and zero otherwise, *Entrenchment Index* is an indicator variable that takes a value of 1 if the current CEO has at least 10 years of tenure and the firm has negative stock returns, and zero otherwise, *Duality* is an indicator variable that takes a value of 1 if the current CEO is also the chairman of the board and zero otherwise, *CEO Ownership* is an indicator variable that takes a value of 1 if the percentage of equity owned by the current CEO is greater than 5% and zero otherwise, *Leverage* is calculated as long-term debt divided by the sum of long-term debt and the market value of equity, *Stock Return* is the cumulative one-year monthly stock return, *Board Size* is the total number of directors on the board, *Board Independence* is the proportion of independent directors on the board, *Total Director Ownership* is the percentage of equity owned by outside directors, *Institutional Investors* is the total number of institutional investors, and *HHI* is the sum squared percentage ownership of the top five institutional investors. All variables are measured at the end of the fiscal year, except for *Stock Return Volatility* and *Stock Return*, which are measured as of June of the current fiscal year. See Appendix C for more details. Standard deviations are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Variable	**Panel A. Board activity**		**Panel B. Monitoring activity**		**Panel C. Advising activity**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
% Equity-based Compensation	− 0.0029	0.0116*	0.0388	0.0677**	− 0.5415***	− 0.4768***
	[0.0333]	[0.0272]	[0.1092]	[0.1225]	[0.5107]	[0.5925]
Firm Size	0.0612***	0.0920***	0.0974***	0.0877***	0.2423***	0.2748***
	[0.0057]	[0.0091]	[0.0052]	[0.0101]	[0.0228]	[0.0432]
Ln(Number of Segments)	0.0242***	0.0209***	0.0180***	0.0113*	− 0.0611**	− 0.0551**
	[0.0136]	[0.0110]	[0.0100]	[0.0100]	[0.0423]	[0.0439]
Investments	0.0400***	0.0169**	− 0.0037	− 0.0041	0.0451	0.0475
	[0.0836]	[0.0677]	[0.0783]	[0.0759]	[0.3675]	[0.3536]
Market-to-Book	− 0.0551***	− 0.0577***	− 0.0446***	− 0.0435***	− 0.0302	− 0.0281
	[0.0115]	[0.0096]	[0.0099]	[0.0099]	[0.0401]	[0.0396]
Stock Return Volatility	0.0976***	0.0747***	0.0498***	0.0529***	0.1053*	0.1037*

	[0.2080]	[0.1739]	[0.1598]	[0.1645]	[0.6556]	[0.6532]
Stock Return Volatility Squared	− 0.0239*	− 0.0297**	− 0.0158	− 0.0195	− 0.0623	− 0.0457
	[0.2735]	[0.2404]	[0.2237]	[0.2384]	[1.0541]	[1.0294]
Free Cash Flow	− 0.0609***	− 0.0660***	− 0.0642***	− 0.0539***	− 0.1541***	− 0.0987
	[0.0182]	[0.0192]	[0.0144]	[0.0196]	[0.0597]	[0.0802]
Entrenchment Index		− 0.0968		− 0.1008***		− 0.0968
		[0.0768]		[0.0214]		[0.0768]
Duality		0.1643		− 0.051		0.1643
		[0.1369]		[0.0331]		[0.1369]
CEO Ownership		0.2394		0.0079		0.2394
		[0.2230]		[0.0421]		[0.2230]
Free Cash Flow × Entrenchment Index		− 0.1438		0.0109		− 0.1438
		[0.1895]		[0.0442]		[0.1895]
Free Cash Flow × Duality		− 0.0413		0.0067		− 0.0413
		[0.0977]		[0.0256]		[0.0977]
Free Cash Flow × CEO Ownership		− 0.2633		− 0.0695		− 0.2633
		[0.2517]		[0.0488]		[0.2517]
Leverage		− 0.0456*		− 0.0061		− 0.0456*
		[0.1635]		[0.0375]		[0.1635]
Stock Returns		− 0.0973		0.0026		− 0.0973
		[0.0555]		[0.0007]		[0.0555]
Board Size		0.0356		0.0308***		0.0356
		[0.0161]		[0.0038]		[0.0161]
Board Independence		0.0885***		0.0569***		0.0885***
		[0.2254]		[0.0533]		[0.2254]
Total Director Ownership		− 0.0074		− 0.0155**		− 0.0074
		[0.0022]		[0.0004]		[0.0022]
Institutional Investors		− 0.0618		− 0.015		− 0.0618
		[0.0002]		[0.0001]		[0.0002]
HHI		− 0.0429*		0.0142**		− 0.0429*
		[0.0001]		[0.0000]		[0.0001]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3276	3276	3276	3276	1404	1404
1st stage F-value			236.863	169.488	83.5401	53.6169

P-value from Wu–Hausman tests			0.8362	0.0519	0	0.0002
Adjusted R-squared	0.1361	0.2554	0.0854	0.1021		

I find that the coefficient on *% Equity-based Compensation* is positive and significant in Model 2 in both Panels A and B, consistent with the expectation that firms using more incentive-based pay have more active boards and monitoring committees. In contrast, the coefficient on *% Equity-based Compensation* is negative for advising activity in Panel C. A possible explanation is that when paid with equity-based compensation, outside directors rely on managers (who have the most relevant knowledge) to make key decisions, but then monitor more to ensure that managers are performing in a satisfactory manner (given the positive coefficient for monitoring activity in Panel B). In terms of the economic significance, a one-standard-deviation change in *% Equity-based Compensation* (22%, or more than $300,000) is associated with a 1% increase in the aggregate number of board and committee meetings, a 10% increase in monitoring committee meetings, and a 38% decrease in advising committee meetings (or less than one meeting in each case). The coefficients for other variables have the same sign and a similar magnitude to those in Table 2.

As a robustness check, I estimate the effect of equity-based compensation on director activity for firms in Large-Cap, Mid-Cap, and Small-Cap groups. The results (not tabled) are qualitatively similar: A higher proportion of equity-based compensation is associated with higher board and monitoring activity but lower advising activity (although the association between equity-based compensation and board activity is not significant for the Large-Cap group).

Of note, while both equity-based compensation and meeting fees appear to encourage monitoring activity, only meeting fees seem to motivate advising activity, suggesting different incentive mechanisms have different effects on different types of activities. Moreover, the results from Table 2 suggest that paying meeting fees seems to have a stronger effect in motivating activity than a one-standard-deviation change in equity-based compensation. This is something of a puzzle in that the average meeting fee is $1000 (or less than $29,000 total meeting fees per director per year because the average firm has eight board meetings and 21 committee meetings) while a one-standard deviation increase in equity-based pay equates to more than $36,000 per director. Yet, when roughly the same dollar amount of compensation is paid, there is significantly more director activity for meeting fees compared with equity-based pay.

5.1.2. The effect of activity on compensation

In this section, I examine the effect of activity on *Total Board Compensation* using 2SLS specifications to address simultaneity concerns. Similar to the earlier analyses, in this section I use the prior year's median industry board activity as the instrumental variable in the first-stage regression. The rationale for this indicator variable is that directors would not want to appear less diligent than directors of peer firms by having fewer meetings. At the same time, directors do not want to meet too often because meetings are costly for them. Thus, industry norms should affect director activity. However, the number of meetings that other boards hold should not affect director compensation at a particular firm (except through that firm's director activity). In the second-stage regressions, I include the predicted board activity from the first-stage regressions, along with other variables as before. I use two proxies for board activity, *Board Meetings* and *Total Board and Committee Meetings*. To conserve space, I report only the results from the second-stage regressions in Table 4. Again, the requirement that activity data be available in the prior year for the first stage regression decreases the number of observations to 4047.

Table 4. Effects of activity on compensation.
This table reports the results from the second stage of 2SLS regression models (Panel A) and the results from OLS regression models (Panels B and C). The dependent variables are the natural logarithm of *Total Board Compensation* (Panels A and B) and the natural logarithm of *Total Director Compensation* (Panel C). The instrumental variables in the first stage are the lagged industry median of the natural logarithm of *Board Meetings* and the lagged industry median of the natural logarithm of *Board and Committee Meetings*. The variables are defined as follows: *Total Board Compensation* is the total compensation paid to all outside directors on the board; *Total Director Compensation* is the average total compensation paid to an outside director on the board; *Board Meetings* is the number of board meetings; *Board and Committee Meetings* is the total number of both board and all committee meetings; *Firm Size* is the natural logarithm of the firm's market capitalization; *Segments* is the sum of business and geographic segments; *Market-to-Book* is the natural logarithm of the firm's market-to-book value of equity; *Investments* is the sum of R&D expenditures, the absolute value of capital expenditures, and the absolute value of mergers and acquisitions expenditures, scaled by total assets; *Stock Return Volatility* is the standard deviation of the firm's one-year monthly stock return; *Free Cash Flow* is an indicator variable that takes a value of 1 if the firm's free cash flow scaled by total assets is greater than 5%, and zero otherwise; *Entrenchment Index* is an indicator variable that takes a value of 1 if the current CEO has at least 10 years of tenure and the firm has negative stock returns, and zero otherwise; *Duality* is an indicator variable that takes a value of 1 if the current CEO is also the chairman of the board and zero otherwise; *CEO Ownership* is an indicator variable that takes a value of 1 if the percentage of equity owned by the current CEO is greater than 5%, and zero otherwise; *Leverage* is calculated as long-term debt divided by the sum of long-term debt and the market value of equity; *Stock Return* is the cumulative one-year monthly stock return; *Board Size* is the total number of directors on the board; *Board Independence* is the proportion of independent directors on the board; *Total Director Ownership* is the percentage of equity owned by outside directors; *Institutional Investors* is the total number of institutional investors; and *HHI* is the sum squared percentage ownership of the top five institutional investors. All variables are measured at the end of the fiscal year, except for *Stock Return Volatility* and *Stock Return*, which are measured as of June of the current fiscal year. See Appendix C for more details. Standard deviations are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Panel A. 2SLS				**Panel B. OLS**				**Panel C. Director-level total compensation**			
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Ln(Board Meetings)	0.1483***	0.0900**			0.0938***	0.0710***			0.0761***	0.0652***		
	[0.0985]	[0.0953]			[0.0213]	[0.0202]			[0.0191]	[0.0188]		
Ln(Board and Committee Meetings)			0.0986**	− 0.037			0.1793***	0.1340***			0.1145***	0.1112***
			[0.1234]	[0.1395]			[0.0242]	[0.0238]			[0.0222]	[0.0223]

Firm Size	0.4641***	0.4497***	0.4519***	0.4612***	0.4718***	0.4507***	0.4249***	0.4277***	0.3124***	0.4194***	0.2846***	0.4007***
	[0.0075]	[0.0126]	[0.0116]	[0.0144]	[0.0065]	[0.0126]	[0.0065]	[0.0124]	[0.0058]	[0.0117]	[0.0060]	[0.0116]
Ln(Number of Segments)	0.0514***	0.0415***	0.0522***	0.0437***	0.0531***	0.0418***	0.0491***	0.0409***	0.0391***	0.0262***	0.0372***	0.0256***
	[0.0143]	[0.0133]	[0.0140]	[0.0136]	[0.0141]	[0.0132]	[0.0136]	[0.0130]	[0.0126]	[0.0123]	[0.0124]	[0.0121]
Investments	0.0389***	0.0612***	0.0466***	0.0653***	0.0412***	0.0620***	0.0475***	0.0643***	0.0879***	0.0689***	0.0926***	0.0711***
	[0.0924]	[0.0877]	[0.0884]	[0.0886]	[0.0905]	[0.0862]	[0.0873]	[0.0845]	[0.0810]	[0.0802]	[0.0799]	[0.0790]
Market-to-Book	− 0.0557***	− 0.0378***	− 0.0580***	− 0.0534***	− 0.0624***	− 0.0401***	− 0.0450***	− 0.0316***	− 0.0188**	− 0.0325***	− 0.0096	− 0.0261***
	[0.0153]	[0.0147]	[0.0165]	[0.0161]	[0.0137]	[0.0133]	[0.0133]	[0.0130]	[0.0123]	[0.0123]	[0.0122]	[0.0122]
Stock Return Volatility	0.0900***	0.1089***	0.0973***	0.1233***	0.0962***	0.1109***	0.0885***	0.1054***	0.1254***	0.1200***	0.1228***	0.1163***
	[0.2528]	[0.2378]	[0.2468]	[0.2473]	[0.2462]	[0.2329]	[0.2378]	[0.2285]	[0.2205]	[0.2166]	[0.2178]	[0.2137]
Stock Return Volatility Squared	− 0.0053	− 0.0174	− 0.012	− 0.0266	− 0.0087	− 0.0188	− 0.0092	− 0.019	− 0.0469**	− 0.0348*	− 0.0486**	− 0.0355*
	[0.4358]	[0.4073]	[0.4217]	[0.4168]	[0.4312]	[0.4036]	[0.4163]	[0.3955]	[0.3862]	[0.3752]	[0.3812]	[0.3699]
Free Cash Flow	− 0.0097	0.0522*	− 0.0081	0.0323	− 0.0196	0.0499*	0.0154	0.0684***	0.0886***	0.0630**	0.1074***	0.0775***
	[0.0212]	[0.0271]	[0.0232]	[0.0294]	[0.0199]	[0.0267]	[0.0193]	[0.0263]	[0.0178]	[0.0249]	[0.0177]	[0.0246]
Entrenchment Index		− 0.1374***		− 0.1607***		− 0.1407***		− 0.1290***		− 0.1442***		− 0.1354***
		[0.0301]		[0.0316]		[0.0294]		[0.0288]		[0.0273]		[0.0270]
Duality		− 0.0801*		− 0.1203**		− 0.0862*		− 0.0691		− 0.0615		− 0.0495
		[0.0468]		[0.0487]		[0.0452]		[0.0443]		[0.0420]		[0.0414]

CEO Ownership		− 0.0227		− 0.0333		− 0.0236		− 0.0039		0.0632		0.0792
		[0.0561]		[0.0582]		[0.0560]		[0.0549]		[0.0521]		[0.0514]
Free Cash Flow × Entrenchment Index		0.0321		0.0636		0.0372		0.0189		0.0448		0.0305
		[0.0589]		[0.0610]		[0.0579]		[0.0568]		[0.0539]		[0.0532]
Free Cash Flow × Duality		0.0344		0.0222		0.0322		0.0344		0.0421		0.0431
		[0.0352]		[0.0360]		[0.0349]		[0.0342]		[0.0324]		[0.0320]
Free Cash Flow × CEO Ownership		− 0.2732***		− 0.2715***		− 0.2736***		− 0.2681***		− 0.2839***		− 0.2791***
		[0.0648]		[0.0666]		[0.0647]		[0.0635]		[0.0602]		[0.0594]
Leverage		0.0357**		0.0426**		0.0370**		0.0373**		0.0255**		0.0262**
		[0.0527]		[0.0525]		[0.0503]		[0.0493]		[0.0468]		[0.0461]
Stock Returns		− 0.3451**		− 0.3088**		− 0.3343**		− 0.2667*		− 0.2375*		− 0.178
		[0.0192]		[0.0196]		[0.0190]		[0.0186]		[0.0177]		[0.0174]
Board Size		0.1413**		0.1471**		0.1414**		0.1237**		− 0.0978***		− 0.1124***
		[0.0042]		[0.0052]		[0.0042]		[0.0041]		[0.0039]		[0.0039]
Board Independence		0.0905**		0.1056**		0.0924**		0.0762**		0.0325**		0.0197**
		[0.0743]		[0.0986]		[0.0681]		[0.0675]		[0.0633]		[0.0632]
Total Director Ownership		− 0.0456***		− 0.0481***		− 0.0457***		− 0.0406***		− 0.0509***		− 0.0468***
		[0.0006]		[0.0006]		[0.0006]		[0.0006]		[0.0005]		[0.0005]
Institutional Investors		− 0.0881***		− 0.0784***		− 0.0864***		− 0.0865***		− 0.0734***		− 0.0728***
		[0.0001]		[0.0001]		[0.0001]		[0.0001]		[0.0001]		[0.0001]
HHI		− 0.0137		− 0.0109		− 0.0133		− 0.0181**		− 0.0119		− 0.0158*
		[0.0000]		[0.0000]		[0.0000]		[0.0000]		[0.0000]		[0.0000]

Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	4047	4047	4042	4042	4047	4047	4047	4047	4047	4047	4047	4047
1st stage F-value	200.381	181.18	165.057	119.954								
P-value from Wu–Hausman tests	0.1321	0.1013	0.0701	0.0005								
Adjusted R-squared	0.4119	0.4948	0.4471	0.4428	0.4213	0.5012	0.4608	0.5209	0.3121	0.3612	0.3297	0.3789

Consistent with expectations, and with Brick et al.'s (2006) results for a sample from the 1992 to 2001 period, I find that increased board activity is associated with higher board compensation, although the evidence is weaker when board activity is measured by *Board and Committee Meetings*. For example, a one-standard-deviation increase in Ln(*Board Meetings*) is associated with 9% (or approximately $150,000) higher *Total Board Compensation* (Model 2, Panel A). This increase seems small but it is consistent with meeting fees being a small proportion of director total compensation. Note that Wu–Hausman tests fail to reject the hypothesis that Ln(*Board Meetings*) is exogenous, suggesting that OLS models are more efficient for examining the effect of board activity (as measured by *Board Meetings*) on *Total Board Compensation*. Therefore, as a robustness check, in Panel B, I report the results from OLS regressions. The results are qualitatively similar to those from the 2SLS regressions. As a further robustness check in Panel C, I report the results from OLS regressions with director-level compensation as the dependent variable. The results again are consistent — higher activity is associated with higher director compensation. For example, a one-standard-deviation increase in Ln(*Board Meetings*) is associated with 6% (or approximately $10,000) higher *Director Compensation* (Model 2, Panel C).

Focusing on firm characteristics that determine demand for director effort, I find that more complex firms (i.e., larger firms and firms with more segments) pay their directors more. From Model 2 in Panel A, a one-standard-deviation increase in *Firm Size* is associated with an increase of 45% in *Total Board Compensation* (or more than $675,000) or a 42% increase in individual director compensation (or approximately $70,000), whereas a one-standard-deviation increase in Ln(*Segments*) (roughly two segments) is associated with an increase of just over 4% in *Total Board Compensation* and approximately 3% in individual director compensation. These findings are consistent with the hypothesis that complexity increases the benefits of director effort, thus leading firms to demand more effort and pay their directors more. However, the results for growth opportunities are mixed. A one-standard-deviation increase in *Market-to-Book* increases *Total Board Compensation* by 6% (or $86,000); in contrast, a one-standard-deviation increase in *Investments* is associated with a 4% decrease in *Total Board Compensation* (or about $60,000) (Model 2, Panel A). Nevertheless, the effect of *Market-to-Book* dominates that of *Investments*. In particular, firms with more growth opportunities (those at the 75th percentile of *Market-to-*

Book and *Investments*) pay approximately 2% more than those with fewer growth opportunities (those at the 25th percentile of *Market-to-Book* and *Investments*).

With respect to information asymmetry, after controlling for potential non-linearity by adding (*Stock Return Volatility*)^2, I find a positive and significant association between *Stock Return Volatility* and *Total Board Compensation* across all models. A one-standard-deviation increase in *Stock Return Volatility* is associated with an increase of almost 9–12% in *Total Board Compensation* (or about $120,000–$160,000). This finding is consistent with the hypothesis that increased information asymmetry increases the demand for board effort to overcome such problem. The coefficient on *Free Cash Flow*, a proxy for potential agency costs, is not significant.

Overall, the results from Table 4 parallel the findings for director activity reported earlier in Table 2, and are consistent with the contention that directors are paid more when director effort is more beneficial.

5.2. Additional dimensions of board compensation

In Table 5, Table 6, I focus on several additional dimensions of director compensation. First, I study the determinants of the proportion of total compensation that is equity based and the likelihood that a firm pays meeting fees. Second, I examine the interaction between equity-based compensation and meeting fees on each other and on total compensation.

Table 5. Equity-based compensation and meeting fees.

This table reports the determinants of the proportion of equity-based compensation and whether firms pay meeting fees. Panel A reports the marginal effects for a one-standard-deviation increase from the mean for the continuous variables and for a move from zero to one for the indicator variables using Tobit regression models. The dependent variable is *% Equity-based Compensation*, the proportion of total compensation paid in the form of stock or stock options for the whole board. Panel B reports the marginal effects of a one-standard-deviation increase from the mean for the continuous variables and for a move from zero to one for the indicator variables using probit regression models. The dependent variable is *Meeting Fees*, an indicator variable that equals 1 if the firm pays fees per board or committee meeting, and zero otherwise. Explanatory variables are defined as follows: *Firm Size* is the natural logarithm of the firm's market capitalization; *Segments* is the sum of business and geographic segments; *Market-to-Book* is the natural logarithm of the firm's market-to-book value of equity; *Investments* is the sum of R&D expenditures, the absolute value of capital expenditures, and the absolute value of mergers and acquisitions expenditures, scaled by total assets; *Stock Return Volatility* is the standard deviation of the firm's one-year monthly stock return; *Free Cash Flow* is an indicator variable that takes a value of 1 if the firm's free cash flow scaled by total assets is greater than 5%, and zero otherwise; *Entrenchment Index* is an indicator variable that takes a value of 1 if the current CEO has at least 10 years of tenure and the firm has negative stock returns, and zero otherwise; *Duality* is an indicator variable that takes a value of 1 if the current CEO is also the chairman of the board, and zero otherwise; *CEO Ownership* is an indicator variable that takes a value of 1 if the percentage of equity owned by the current CEO is greater than 5%, and zero otherwise; *Leverage* is calculated as long-term debt divided by the sum of long-term debt and the market value of equity; *Stock Return* is the cumulative one-year monthly stock return; *Board Size* is the total number of directors on the board; *Board Independence* is the proportion of independent directors on the board; *Total Director Ownership* is the percentage of equity owned by outside directors; *Institutional Investors* is the total number of institutional investors; and *HHI* is the sum squared percentage ownership of the top five institutional investors. All variables are measured at the end of the fiscal year, except for *Stock Return Volatility* and *Stock Return*, which are measured as of June of the current

fiscal year. See Appendix C for more details. Standard deviations are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Variable	**Panel A. % Equity-based Compensation**		**Panel B. Meeting Fees**	
	Model 1	**Model 2**	**Model 1**	**Model 2**
Firm Size	0.0386***	0.0542***	− 0.0010***	− 0.0003***
	[0.000]	[0.000]	[< .0001]	[0.2567]
Ln(Segments)	− 0.0109***	− 0.0107***	− 0.0004**	− 0.0004***
	[0.001]	[0.001]	[0.0104]	[0.0061]
Investments	0.0167***	0.0161***	− 0.0005***	− 0.0005***
	[0.000]	[0.000]	[0.0015]	[0.0004]
Market-to-Book	0.0221***	0.0210***	− 0.0005***	− 0.0004***
	[0.000]	[0.000]	[0.0011]	[0.0042]
Stock Return Volatility	0.0214***	0.0216***	− 0.0010***	− 0.0009***
	[0.002]	[0.003]	[0.0023]	[0.0057]
Stock Return Volatility Squared	− 0.0145**	− 0.0118*	0.0004	0.0003
	[0.016]	[0.069]	[0.1549]	[0.2610]
Free Cash Flow	0.0165**	0.0109	0.0002	0.0001
	[0.018]	[0.227]	[0.2003]	[0.5476]
Entrenchment Index		0.0031		− 0.0001
		[0.445]		[0.5897]
Duality		0.0002		− 0.0001
		[0.966]		[0.7221]
CEO Ownership		− 0.0357**		− 0.0001
		[0.049]		[0.8152]
Free Cash Flow × Entrenchment Index		− 0.0013		0.0002
		[0.751]		[0.3748]
Free Cash Flow × Duality		0.0045		0.0001
		[0.410]		[0.6586]
Free Cash Flow × CEO Ownership		− 0.0048		0.0001
		[0.347]		[0.6037]
Leverage		− 0.0056*		0.0003**
		[0.059]		[0.0214]
Stock Returns		− 0.0017		0.0030
		[0.528]		[0.3151]
Board Size		− 0.0191***		0.0005***
		[0.000]		[0.0037]

Board Independence		0.0156***		− 0.0001
		[0.000]		[0.5191]
Total Director Ownership		− 0.0042		− 0.0001
		[0.108]		[0.4776]
Institutional Investors		− 0.0115**		− 0.0010***
		[0.039]		[< .0001]
HHI		0.0006		− 0.0001
		[0.816]		[0.3165]
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Left-censored observations	183	183	4354	4354
Right-censored observations	24	24		
Pseudo R-squared/adjusted R-squared	13.9432	15.6646	0.0940	0.1028
Log likelihood			− 2552	− 2531

Table 6. Effect of different types of incentive payments.
This table reports the effect of whether firms pay meeting fees on the proportion of equity-based compensation and director total compensation. Panel A of this table reports the marginal effects for a one-standard-deviation increase from the mean for the continuous variables and for a move from zero to one for the indicator variables using Tobit regression models in which the dependent variable is *% Equity-based Compensation*. Panels B and C of this table report the results from OLS regression models with the logarithm of *Total Board Compensation* and the logarithm of *Total Director Compensation* as the dependent variables, respectively. The variables are defined as follows: *% Equity-based Compensation* is the proportion of total compensation paid in the form of stock or stock options for the whole board; *Total Board Compensation* is the total compensation paid to all outside directors on the board; *Total Director Compensation* is the average total compensation paid to an outside director on the board; *Meeting Fees* is an indicator variable that equals 1 if the firm pays fees per board or committee meeting, and zero otherwise; *Firm Size* is the natural logarithm of the firm's market capitalization; *Segments* is the sum of business and geographic segments; *Market-to-Book* is the natural logarithm of the firm's market-to-book value of equity; *Investments* is the sum of R&D expenditures, the absolute value of capital expenditures, and the absolute value of mergers and acquisitions expenditures, scaled by total assets; *Stock Return Volatility* is the standard deviation of the firm's one-year monthly stock return; *Free Cash Flow* is an indicator variable that takes a value of 1 if the firm's free cash flow scaled by total assets is greater than 5%, and zero otherwise; *Entrenchment Index* is an indicator variable that takes a value of 1 if the current CEO has at least 10 years of tenure and the firm has negative stock returns, and zero otherwise; *Duality* is an indicator variable that takes a value of 1 if the current CEO is also the chairman of the board, and zero otherwise; *CEO Ownership* is an indicator variable that takes a value of 1 if the percentage of equity owned by the current CEO is greater than 5%, and zero otherwise; *Leverage* is calculated as long-term debt divided by the sum of long-term debt and the market value of equity; *Stock Return* is the cumulative one-year monthly stock return; *Board Size* is the total number of directors on the board; *Board Independence* is the proportion of independent directors on the board; *Total Director Ownership* is the percentage of equity owned by outside directors; *Institutional Investors* is the total number of institutional investors; and *HHI* is the sum squared percentage ownership of the top five institutional investors. All variables are measured at

the end of the fiscal year, except for *Stock Return Volatility* and *Stock Return*, which are measured as of June of the current fiscal year. See Appendix C for more details. Standard deviations are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Variable	**Panel A. % Equity-based Compensation**		**Panel B. Total Board Compensation**		**Panel C. Director-level total compensation**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Meeting Fees	− 0.0416***	− 0.0403***	− 0.0243	− 0.0467***	− 0.0605***	− 0.0575***
	[0.000]	[0.000]	[0.0181]	[0.0169]	[0.0162]	[0.0157]
Firm Size	0.0358***	0.0535***	0.4894***	0.4568***	0.3204***	0.4234***
	[0.000]	[0.000]	[0.0064]	[0.0124]	[0.0057]	[0.0115]
Ln(Number of Segments)	− 0.0119***	− 0.0117***	0.0561***	0.0417***	0.0395***	0.0250***
	[0.000]	[0.000]	[0.0140]	[0.0131]	[0.0124]	[0.0121]
Investments	0.0156***	0.0149***	0.0371***	0.0589***	0.0797***	0.0628***
	[0.000]	[0.000]	[0.0886]	[0.0838]	[0.0790]	[0.0778]
Market-to-Book	0.0209***	0.0200***	− 0.0797***	− 0.0545***	− 0.0333***	− 0.0457***
	[0.000]	[0.000]	[0.0134]	[0.0128]	[0.0120]	[0.0119]
Stock Return Volatility	0.0191***	0.0196***	0.1063***	0.1133***	0.1268***	0.1228***
	[0.007]	[0.006]	[0.2215]	[0.2145]	[0.1974]	[0.1991]
Stock Return Volatility Squared	− 0.0136**	− 0.0112*	− 0.0146	− 0.0144	− 0.0476***	− 0.0333**
	[0.022]	[0.084]	[0.3360]	[0.3399]	[0.2995]	[0.3153]
Free Cash Flow	0.0174**	0.0115	− 0.0312	0.0534**	0.0848***	0.0710***
	[0.012]	[0.199]	[0.0196]	[0.0263]	[0.0175]	[0.0244]
Entrenchment Index		0.0029		− 0.1487***		− 0.1508***
		[0.484]		[0.0290]		[0.0269]
Duality		0.0000		− 0.0906**		− 0.0656
		[0.994]		[0.0442]		[0.0410]
CEO Ownership		− 0.0360**		− 0.0425		0.0401
		[0.046]		[0.0547]		[0.0508]
Free Cash Flow × Entrenchment Index		− 0.0008		0.0652		0.0675
		[0.828]		[0.0568]		[0.0527]
Free Cash Flow × Duality		0.0047		0.0111		0.0224
		[0.383]		[0.0345]		[0.0320]
Free Cash Flow × CEO Ownership		− 0.0046		− 0.2447***		− 0.2515***
		[0.373]		[0.0631]		[0.0585]
Leverage		− 0.0048		0.0402***		0.0291***

		[0.102]		[0.0495]		[0.0459]
Stock Returns		− 0.0014		− 0.0210**		− 0.0174**
		[0.595]		[0.0011]		[0.0010]
Board Size		− 0.0181***		0.1451***		− 0.0951***
		[0.000]		[0.0041]		[0.0038]
Board Independence		0.0154***		0.1012***		0.0420***
		[0.000]		[0.0670]		[0.0622]
Total Director Ownership		− 0.0044*		− 0.0389***		− 0.0429***
		[0.092]		[0.0005]		[0.0005]
Institutional Investors		− 0.0143***		− 0.0832***		− 0.0719***
		[0.010]		[0.0001]		[0.0001]
HHI		0.0003		− 0.0137*		− 0.0173**
		[0.898]		[0.0000]		[0.0000]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	4354	4354	4354	4354	4354	4354
Left-censored observations	183	183				
Right-censored observations	24	24				
Pseudo R-squared/adjusted R-squared	0.1480	0.1648	0.402	0.488	0.2893	0.3406

5.2.1. Determinants of equity-based compensation and meeting fees

In Table 5, Panel A, I model equity-based compensation as a percentage of total board compensation. I use two-sided Tobit regression models, because the proportion of equity-based compensation is truncated 0% and 100%. I again report marginal effects for a one-standard-deviation increase from the mean for the continuous variables and for a move from zero to one for the indicator variables.

I find that large firms (*Size*) pay a greater proportion of director compensation in the form of stock and stock options. In contrast, *Segments* is negatively associated with the proportion of incentive pay. However, the effect of *Size* dominates that of *Segments*. In particular, more complex firms (those at the 75th percentile of firm size and the number of segments) pay approximately 12% more in stock and stock options than less complex firms (those at the 25th percentile of firm size and the number of segments). Thus, there is evidence, albeit weak, that more complex firms pay directors with more incentives.

I also find that firms with more growth opportunities pay more equity-based compensation; the coefficients on *Market-to-Book* and *Investments* are positive and significant at the 1% level. From Model 2, one-standard-deviation increases in *Market-to-Book* and *Investments* are associated with 1.6% and 2.1% increases, respectively, in the proportion of equity-based compensation. These findings are consistent with the hypothesis that future growth opportunities make it more difficult to measure director performance, and as a result, directors are more likely to be paid in stock and stock options to

encourage effort. Furthermore, I find that *Stock Return Volatility* is positively and significantly associated with the proportion of equity-based compensation, while the coefficient on (*Stock Return Volatility*)^2 is negative and significant.[17] This again supports Kumar and Sivaramkrishman's (2008) prediction of a concave association between information asymmetry and the proportion of equity-based compensation. However, consistent with the earlier results, I find no significant association between *Free Cash Flow* and the proportion of equity-based compensation.

The coefficients of the other control variables are generally as expected. For example, *Leverage* is associated with a lower proportion of equity-based compensation, consistent with the findings of prior work (e.g., Linck et al., 2009). *Board Size* is negatively associated with the proportion of equity-based compensation, whereas the opposite is true for *Board Independence*. Model 2 suggests that a one-standard-deviation increase in *Board Independence* (12%) is associated with a 1.6% increase in the proportion of incentive compensation. This finding suggests that director independence and director incentive pay are complements, counter to Kumar and Sivaramkrishman's (2008) prediction that director independence and director incentive pay are substitutes. Among the controls for CEO characteristics, only *CEO Ownership* is negatively and significantly associated with the proportion of equity-based compensation for the board, again suggesting that empowered CEOs, at the margin, might act to reduce director effort. In sum, Panel A provides evidence that is generally consistent with the hypothesis that when firms are expected to benefit from director effort and when it is more difficult to measure director performance, firms pay a higher proportion of incentive-based compensation.[18]

In Panel B, I use probit regression models to study the likelihood that firms pay meeting fees. I report marginal effects for a one-standard-deviation increase from the mean for the continuous variables and for a move from zero to one for indicator variables. I find that complexity, growth opportunities, and information asymmetry are significantly negatively associated with the likelihood of paying meeting fees, although the economic significance is small (the marginal effects are almost zero). At first glance, these findings seem counter to the hypothesis that these firms benefit more from director effort and therefore should rely more on incentive-based compensation to encourage such effort. However, recall from Panel A that such firms pay their directors with a higher proportion of equity-based compensation. Thus, it might be the case that equity-based compensation and meeting fees are used as substitutes.

5.2.2. How do different components of director compensation interact?

To examine whether equity-based compensation and meeting fees are substitutes (or complements), I perform several additional tests. The results are reported in Table 6.

Panel A reports the results from two-sided Tobit regressions in which the dependent variable is the proportion of equity-based pay. The explanatory variables include firm, board, CEO, and institutional ownership characteristics as before; however, in each model, I include the indicator variable *Meeting Fees* to capture whether a firm pays meeting fees. Again, I report marginal effects for a one-standard-deviation increase from the mean for the continuous variables and for a move from zero to one for the indicator variables. The negative coefficient on *Meeting Fees* indicates that firms paying meeting fees rely less on equity-based compensation — approximately 4% less than other firms (Panel A, Models 1 and 2). This finding suggests that meeting fees are a form of incentive compensation that substitutes for equity-based compensation.

In Panels B and C, I examine the association between paying meeting fees and total compensation using OLS specifications, with the natural logarithm of *Total Board Compensation* and the natural logarithm of director-level compensation as the dependent variables, respectively. In addition to lower equity-based compensation, firms that pay meeting fees pay slightly lower total compensation (about 5% or $70,000 less for the board as a whole

(Model 2, Panel B) and about 6% or $10,000 less at the direct level (Model 2, Panel C)) than other firms, qualitatively similar to Adams and Ferreira's (2008) results for a sample of firms during the 1996–2003 period. Also note that *Firm Size* is included in all specifications; therefore, the difference in total compensation is not likely due to a size effect. The results are robust to different size groups other than the effect of meeting fees on director-level compensation for the Large-Cap group, which becomes marginally insignificant.

6. Conclusion

Boards of directors play an important role in attenuating potential agency costs that arise from the separation of ownership and control. However, there is relatively little evidence about the contractual relationship between firms and their boards. Since the passage of the Sarbanes–Oxley Act in 2002, the director labor market has changed significantly. In addition, new disclosure requirements adopted by the Securities and Exchange Commission in 2006 allowed me to create a new and unique data set of director compensation and activity to examine how firms contract with their boards. In particular, I study the link between director compensation and activity, two central aspects of the contract between firms and their directors. I also study the interactions among different aspects of director compensation (level, equity-based compensation, and meeting fees).

I find that firms use different types of incentive payments, including stock, stock options, and meeting fees, to motivate director effort. Moreover, these different types of payment appear to be used as substitutes. Further, I find that different components of director compensation have different effects on board monitoring and advising activity. In particular, I find that paying directors for attending board/committee meetings is associated with more active boards and more active monitoring and advising committees. However, paying a higher proportion of equity-based compensation is positively associated with monitoring activity, but negatively associated with advising activity. In addition, more active boards and committees are paid more. I also find that, in general, the relationship between a firm and its board of directors reflects a trade-off between the costs and benefits of director effort, consistent with prior work. In particular, when firms benefit more from director effort (such as in complex firms), then they pay directors more and have more active boards and committees. Further, firms with more growth opportunities pay their directors with a higher proportion of equity-based compensation. Finally, I find an inverse U-shaped association between information asymmetry and the proportion of equity-based compensation and activity, consistent with predictions from Kumar and Sivaramkrishman (2008).

This paper contributes to the literature along several dimensions. First, it adds to the contracting literature. The relationship between a firm and its board of directors is a central component of the nexus of contracts that makes up the firm. Thus, understanding this contractual relationship allows us to have a better understanding of the firm itself. Second, this paper contributes to the literature on boards of directors. Taking advantage of the new disclosure requirements, I provide new evidence on the way in which directors are compensated and how different types of compensation are used. In addition, I examine the advising function of boards, an area of study that has received relatively less attention in the previous literature. More importantly, this paper simultaneously studies director compensation and activity, which provides a more thorough understanding of the nature of the contracts between firms and their boards.

Appendix A. Committee classification

1. Monitoring committees	2. Advising committees	3. Other committees
Audit	Finance and investment	Health

Compensation	Organization	Safety
Nominating	Merger and acquisition	Environment
Governance	Strategy	Public policy
Stocks and options	Operations	Charitable
Succession and management development	Technology	Ethics
Independent directors	Executive	Pension and benefits
Proxy	Risk management	Human resources

Appendix B. Sample creation

Cleaning step	Description	# of firm-year observations
	Starting sample: 1800 unique firms derived from Compustat S&P 1500 from 2006 to 2009	
1	No missing Board and Committee meeting data from TCL	5275
2	No missing Board and CEO data from TCL	4864
3	No missing meeting fees data from Morningstar	4690
4	No missing Execucomp data	4687
5	No missing Compustat data	4364
6	No missing CRSP data	4354
7	No missing Thomson Financial data	4354
	Final sample (1384 unique firms)	4354

Appendix C. Variable definitions

Variable	Description
Board Meetings	The number of board meetings during the fiscal year
Monitoring Committee Meetings	The number of monitoring committee meetings during the fiscal year, where monitoring committees are those whose main function is to monitor management
Advising Committee Meetings	The number of advising committee meetings during the fiscal year, where advising committees are those whose main function is to provide advisory services to management
Other Committee Meetings	The number of other committee meetings during the fiscal year, where other committees are those whose main function is neither monitoring nor advising
Board and Committee Meetings	The total number of board and all committee meetings during the fiscal year
Total Board Compensation	Sum of total compensation paid to all outside directors on the board
Total Director Compensation	Average total compensation paid to an outside director on the board
% Equity-based Compensation	Proportion of total board compensation paid in the form of stock or stock options

Meeting Fees (0/1)	Indicator variable that takes a value of 1 if the firm pays fees for attending board or committee meetings, and zero otherwise
Change in Paying Meeting Fees	A variable that takes a value of 1, 0, or − 1, which corresponds to firms that (1) start paying meeting fees, (2) do not change their meeting fee policy, or (3) stop paying meeting fees
Firm Size	Natural logarithm of the firm's total market capital at the end of the fiscal year
Segments	Sum of the number of business and geographic segments at the end of the fiscal year (Compustat Segments file). If the number of business or geographic segments is missing, I assume that the firm has one business or geographic segment.
Market-to-Book	Logarithm of the firm's market-to-book value of equity. Both the market and the book value of equity are measured at the end of the fiscal year.
Investments	Sum of expenditures on R&D, the absolute values of capital expenditures, and the absolute values of acquisition expenditures, scaled by total assets measured at the end of the fiscal year
Stock Return Volatility	Standard deviation of the firm's one-year monthly stock return as of June of the current fiscal year
Free Cash Flow	Indicator variable that equals 1 if free cash flow is greater than 5%, and zero otherwise, where free cash flow is calculated as operating income before depreciation minus interest expense, minus income tax, minus dividends paid for common stock, minus dividends paid for preferred stock, and scaled by total assets (e.g., Titman et al., 2004)
Entrenchment Index	Indicator variable that takes a value of 1 if the current CEO is entrenched and zero otherwise, where a CEO is entrenched if his or her tenure is at least 10 years and the firm has negative stock returns in the prior year
Leverage	Long-term debt divided by the sum of long-term debt and the market value of equity at the end of the fiscal year
Stock Return	Cumulative one-year monthly stock return as of June of the current fiscal year
Board Size	Total number of directors on the board
Board Independence	Proportion of independent directors on the board
Total Director Ownership	Percentage of equity owned by outside directors at the end of the fiscal year
Duality	Indicator variable that takes a value of 1 if the CEO is also the chairman of the board, and zero otherwise
CEO Ownership	Indicator variable that takes a value of 1 if the percentage of equity owned by the current CEO at the end of the fiscal year is greater than 5%, and zero otherwise
Institutional Investors	Total number of institutional investors
Herfindahl–Hirschman Index (HHI)	Sum of squared percentage ownership of the five largest institutional investors

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[1]For example, Jiraporn et al. (2009) and Ahn et al. (2010) study firms in which board members hold multiple outside directorships; Hermalin and Weisbach (1991) focus on director independence; and Klein (1998), Adams (2003), and Hayes et al. (2004) examine committee structure.

[2]For example, Bryan et al. (2000), Brick et al. (2006), and Fedaseyeua et al. (2014) focus on director compensation, but not on board activity, whereas Brick and Chidambaran (2010) focus on board (and audit committee) activity, but not on director compensation. Adams (2003) examines director compensation and meeting frequency as proxies for director effort at the board and committee levels, but focuses on the determinants of director effort rather than on the link between director compensation and activity.

[3]My paper is different from Adams and Ferreira's (2008) in that their paper focuses on how paying meeting fees affects directors' meeting attendance.

[4]See Milgrom and Roberts (1992). Smith and Watts (1992) and Gaver and Gaver, 1993, Gaver and Gaver, 1995 provide consistent evidence with respect to managerial compensation.

[5]Kumar and Sivaramkrishman (2008) argue that an outside director chooses to contract with the manager to maximize the director's welfare function, which is a weighted average of their utilities drawn directly from the firm value and their utilities drawn from the manager's utility. Being uninformed, the director will put more weight on the manager's utility, causing his or her *effective* independence to decrease.

[6]In the context of my paper, agency costs are the *potential* loss of shareholder value as a result of delegating control rights to managers. Agency costs therefore might not be realized if directors can effectively monitor the managers. In other words, the higher the *potential* loss, the more beneficial the director effort becomes.

[7]Since 2006, Execucomp has recorded the value of stock options as reported by each company. However, Coles et al. (2014) find a correlation of 90% between executive compensation reported by the company and executive compensation when the value of stock options is calculated using the Black–Scholes model.

[8]Adams (2003) and Adams and Ferreira (2009) use an alternative measure of activity based on board and committee size and the number of meetings.

[9]Prior work suggests that the proportion of independent directors on boards or committees also proxies for director monitoring effort. As a robustness check, I use the product of the board (or committee) meeting frequency and the proportion of independent directors on the board (or committee) as an alternative proxy for director monitoring. Note that TCL reports committee membership only for audit, compensation, nomination, and governance committees; thus, measures of director independence are available for these committees. I focus on firms that have only these committees (more than half the number of unique firms and close to half of the firm-year observations). The results are generally robust to this alternative measure.

[10]In 2006 dollars.

[11]Linn and Park (2005) report that outside directors at 200 large companies were paid an average of $139,357 per year during the 1996–2001 period; Adams and Ferreira (2008) report an average of $92,049 per outside director from 1996 to 2003 for S&P 1500 firms, while Linck et al. (2008) estimate that median director total compensation for S&P 1500 firms in 2005 was $112,723. Fedaseyeua et al. (2014) report that on average outside directors for S&P1500 firms are paid $178,000 per year during the 2006–2010 period.

[12]In terms of equity-based compensation, almost 50% of the sample firms use both stock and stock options, 34% use only stock, 14% use only stock options, and less than 3% do not use stock or stock options.

[13]Novatel Wireless' Audit Committee met 69 times in 2008 to review its “revenue cut-off procedures, internal control and accounting related to certain customer contracts.” The Loan committee of Bank of the Ozarks met 50, 51, and 48 times in 2006, 2007, and 2008, respectively, to “review and approve all loans and aggregate loan relationships in excess of $3 million.” Broadcom Corp.'s Special litigation committee, which was formed in 2007, met 23 and 27 times in 2007 and 2008, respectively, “to evaluate the claims made in certain shareholder derivative actions.”

[14]Broadcom Corp. paid between $2.7 million and $4 million (or $300K–$560K per director), whereas Bank of the Ozarks paid between $250K and $300K (or $20K–$30K per director) and Novatel Wireless, Inc. paid between $600K and $1 million (or $100K–$200K per director) during the sample period.

[15]The fact that not every firm has advising committees might create another selection bias when examining advising committee activity. Therefore, when estimating the effect of *Meeting Fees* on advising committee activity, I also include in the first-stage estimation an indicator of whether the median firm has advising committees.

[16]For example, in 2007, the board and committees of Time Warner Inc. (operating in eight business and geographic segments and with a market capitalization of around $60 billion) met 36 times, while the board and committees of Exxon Mobil Corp. (with 16 business and geographic segments and a market capitalization of more than $500 billion) met 45 times.

[17]To address the concern of a mechanical association between director compensation (which includes the value of stock options) and the calculated stock return volatility (which proxies for information asymmetry), in a robustness test I exclude the value of stock options from the measure of equity-based compensation. The results are similar.

[18]Note that I also conduct several robustness tests by focusing on Large-Cap, Mid-Cap, and Small-Cap groups. The results are qualitatively similar and the coefficients are more significant for the Large-Cap group than for the Small-Cap group.